

OKEEWEE NATIONAL WILDLIFE REFUGE

BIOLOGICAL REPORT

JULY - DECEMBER
1957.

I. ECOLOGICAL SUCCESSION STUDIES FOLLOWING CONSTRUCTION OF THE SILL.

A. Blackgum-Bay Association.

Two transects of 50 chains each had previously been staked out in the association. One of these was located in Lot 188, an area which will not be affected after the construction of the sill. The other transect was located north and west of the Pocket. Water levels along this transect will be affected by the construction of the sill.

During this period, all trees of 2" d.b.h. and larger were tallied according to species and d.b.h. and all vegetation less than 4-1/2 feet in height was mapped along these transects for a width of 1/4 chain. The data will be submitted in a later report.

B. Severe Burn North of Billy's Lake.

Prior to the fire, the area was covered principally by blackgum and bay timber. All trees had been killed by the fire. A transect one chain wide and ten chains long was staked out. The d.b.h. of all the dead trees was tallied to give a record of the composition of the forest prior to the fire. All sprouts and other vegetation were mapped. This plot will serve as an example of a severely burned area that will be affected by the sill. The data will be submitted in a later report.

II. ECOLOGICAL SUCCESSION FOLLOWING THE 1954-55 FIRE.

A. Soldier's Camp Island.

This is an example of a cypress stand which had been killed by the fires. In this area the peat was burned away entirely. All dead timber was tallied and mapped and all vegetation mapped along a 10 chain transect last year. The changes since then were so little that the area was not remapped this year.

B. Suwannee Canal.

This is an example of a severely burned area where about two feet of peat was burned away leaving about two feet. A transect one chain

wide and ten chains long was staked out and mapped last year. All the dead trees were tallied according to d.b.h. and species. The ground cover was mapped according to species.

In 1957, there was noticeable decline in beakrush, *Ludwigia*, and *Xyris*, and an increase of paintroot, fern and carex. So the plot was remapped. The data will be submitted in a later report.

C. Minnie's Lake.

Last year, a plot five chains long and two chains wide was staked out on the west side of Minnie's Lake. The plot was located here because this was an example of a cypress forest which had not been reached by the fire. All trees were tallied according to d.b.h. and species and the ground cover types were mapped. The total number of stems and the percentage of cover by underbrush is shown on the following tables:

<u>Trees</u>		
<u>Species</u>	<u>No. Stems</u>	<u>Basal Area</u>
<i>Taxodium distichum</i>	608	236.857
<i>Magnolia virginiana</i>	33	4.895
<i>Persea pubescens</i>	64	3.268
<i>Nyssa sylvatica</i>	49	5.405
<i>Cyrilla racemiflora</i>	112	2.271
<i>Ilex cassine</i>	114	8.030
<i>Clethra alnifolia</i>	3	.034
<i>Leucothoe racemosa</i>	1	.006
<i>Desmodium lucidus</i>	38	.324

<u>Percent Ground Cover</u>	
<i>Desmodium lucidus</i> (dense)	39.7
<i>Desmodium</i> , <i>Itea</i> , <i>Clethra</i> , <i>Leucothoe</i> , <i>Cyrilla</i> (sparse)	13.7
<i>Nymphaea odorata</i>	.8
<i>Carex</i> , sp.	4.5
<i>Orontium aquaticum</i> and <i>Eleocharis</i> , sp.	1.3
<i>Cyrilla racemiflora</i>	.1
	<u>60.1</u>

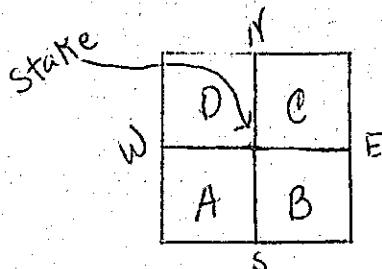
D. Prairie.

As stated in my July-December report, 40 chains of transects were staked out in Chesser Prairie.

The purpose is to establish semi-permanent stations along these transects where the prairie vegetation can be measured periodically to trace the plant succession through wet and dry cycles.

Stakes were driven at 50 link intervals along these transects and the coverage of vegetation was measured on four one-milacre plots at each stake. The locations of the transects are recorded and filed with the field data.

The plots were delineated by the use of a collapsible portable frame which, when opened, is ten links square. By using this frame, one stake serves for locating four plots. The design for the plots is sketched:



Measurements were made in terms of links and tenths of links along five lines at two link intervals across each plot. The figure gotten this way, multiplied by 2 was used in the percent of cover. Plants whose cover is mostly culms and narrow leaves, such as beak rush and spike rush, which do not lend themselves to this kind of measurement, were estimated ocularly.

Only that vegetation which was measurable at the water surface was recorded. It was not practical, at that time, to measure submerged aquatics like bladderwort and sphagnum, nor plants like pipeworts whose measureable portions were at the peat's surface and well submerged at the time the readings were made.

The depth of the water in each plot was measured August 16. On that day the water elevation at Camp Cornelia, about two miles eastward, was 121.24 above sea level. A point 2.80 below the water surface was selected as the zero point for reporting the relative elevations of the plots.

The field data for the 328 plots is too voluminous to be included in this report. They are filed along with a record of plot locations in the refuge office.

The accompanying table shows the percentage of coverage of each species in elevations at 1/10 foot intervals. The two lower figures in each category represents the lowest and the highest percent of cover.

The difference in elevation between the highest and the lowest plot is less than .9'. It is surprising that only one or two-tenths feet in elevation will make such a difference in the occurrence of some species.

The beakrush (*Rynchosia imundata*), which is a fair duck food plant, occurs only scantily from 1.00' to 1.10' elevation. From 1.20' to 1.30' it is a predominant species, second only to water lily. Yet it was found scarcely at all where the elevation was higher than 1.40'.

Maidencane (*Sacciolepis striata*)* appears to have become established at the elevation just above that at which the beakrush became established.

Paintroot (*Lachnanthes tinctoria*), the principal food of the sandhill crane and an important duck food plant, was most commonly encountered at elevations between 1.50' and 1.80'. It was found only sparingly at lower levels.

Water lily (*Nymphaea odorata*) was the commonest plant at all elevations below 1.50'. It is present at higher elevations but the amount of coverage has declined in favor of woody species, paintroot, and maidencane.

Of the woody species, buttonbush (*Cephalanthus occidentalis*) appears to be best adapted for growing in lower elevations. It was found to occur in elevations as low as 1.30', but appeared to be better adapted for somewhat higher elevations.

Water willow (*Decodon verticillatus*) is probably as much or more water tolerant but it did not occur often enough in this series of plots to indicate such tolerance. In the incipient "houses" in the prairies, button bush and water willow are the first woody plants to appear.

Titi (*Cyrilla racemiflora*) occurs at elevations above 1.40'. Above 1.80' it is a predominant species.

*This species, not *Panicum hemitomon*, is called "maiden cane" at Okefenokee.

TABLE I.

COVER BY SPECIES OF VEGETATION ON 328 ONE-MILLICRE PLOTS IN CHESSER PRAIRIE.

Elevation	1.00-1.10	1.11-1.20	1.21-1.30	1.31-1.40	1.41-1.50	1.51-1.60	1.61-1.70	1.71-1.80	1.81-1.90
<i>Lycopodium Carolanum</i>	0-2	t 0-t	0	0	0	0	0	0	0
<i>Taxodium distichum</i>	0	0	0	0	0	0	0	.3 0-2	0
<i>Andropogon, sp.</i>	0	0	0	t 0-t	.2 0-3	.1 0-1	0	0	0
<i>Erianthus saccharoides</i>	0	0	0	0	0	t 0-t	0	.1 0-1	0
<i>Sacciolepis striata</i>	0	0	.1 0-4	3.2 0-50	14.4 t-58	33.0 2-90	50.2 2-93	11.9 t-70	40.0 t-80
<i>Eleocharis elongata</i>	t 0-t	t 0-2	.1 0-2	1.2 0-20	5.0 0-40	0	0	0	0
<i>Rhynchospora imbricata</i>	.1 0-2	1.3 0-40	15.6 0-70	1.3 0-50	0	0	0	0	0
<i>Oreontium aquaticum</i>	.1 0-1	.2 0-2	.2 0-1	.3 0-1	.1 0-1	.1 0-1	0	0	0
<i>Peltandra virginica</i>	t 0-t	0	t 0-t	t 0-1	.2 0-2	.8 0-3	1.0 0-3	2.6 0-8	.7 0-2
<i>Xyris smalliana</i>	0	0	0	t 0-t	0	0	0	0	0
<i>Iris virginica</i>	0	0	t 0-t	t 0-t	0	0	t 0-t	0	0

Elevation	1.00-1.10	1.11-1.20	1.21-1.30	1.31-1.40	1.41-1.50	1.51-1.60	1.61-1.70	1.71-1.80	1.81-1.90
<i>Lachnanthes tinctoria</i>	0	0	0-1	0-2	0-2	0-6	12.6	3-0	t
<i>Nymphaea odorata</i>	41.5 18-59	40.2 10-59	33.5 10-65	42.5 3-65	25.6 0-71	16.4 0-55	1.9 0-15	0-4	1-0 0-3
<i>Cyrilla racemiflora</i>	0	0	0	0	.3 0-2	.1 0-1	.6 0-5	2-4 0-10	32.7 0-95
<i>Ilex Cassine</i>	0	0	0	t 0-1	0	0	0	0	0
<i>Hypericum virginicum</i>	0	0	0	0	t 0-t	0	0	0	0
<i>Decodon verticillatus</i>	0	0	0	0	0	0	0	t 0-t	0
<i>Nymphoides aquaticum</i>	0	0-t	0	0	0	0	0	0	0
<i>Cephalanthus occidentalis</i>	0	0	0	t 0-2	.1 0-2	.6 0-4	4.4 0-15	13.5 0-48	4.6 0-12
<i>Bidens coronata</i>	0	t 0-t	0	0	0	0	0	0	0
<i>Aster</i> sp.	0	0	0	.1 0-1	0	0	0	0	0
Dead Brush	0	0	0	0	5.8 0-75	0	0	9.3 0-75	0
Number of Plots	14	102	135	37	13	8	8	8	3

- Elevations are expressed in hundredths of a foot above 0. 0 = Value given for a point which was 2.80' below water surface when measurements were made.
- Top figure is the percentage of cover for all plots in the category. T = only a trace.

Relative Elevations of other Prairie Types

In order to get more data for determining the relative elevations of associations which were not well represented in the transects, four series of readings were made in random selected locations where several associations were in juxtaposition. The elevations were taken from an average of from five to ten readings in each association in each series.

The following are the typical associations found in Chesser Prairie:

- I. Pickerel weed.
Minor associates: water lily, sphagnum
- II. Waterlily - neverwet
Minor associates: beakrush, spike rush,
sphagnum
- III. Hardhead (Xyris) - Water lily
Minor associates: Neverwet, sphagnum
- IV. Maidencane
Minor associates: Water lily, chain fern,
button bush, spike rush,
sphagnum, pickerel weed,
plume grass, broomsedge
- V. Sedge (Unidentified)
Minor associates: Water lily, neverwet, paint-
root, sphagnum
- VI. Paintroot-sedge (unidentified)
Minor associates: Wampee, chain fern, water
lily, maidencane, neverwet,
sphagnum
- VII. Chain fern-Paintroot-Wampee
Minor associates: Water lily, sedge (?)
water willow, sphagnum,
Rynchosia fascicularis
- VIII. House association: Titi, cassena, sweet bay,
Red bay, White bay, Hurrah
bush, fetterbush, Bamboo
(S. laurifolia), cypress

The average elevations of the associations are shown in the following table.

Relative Elevations of Prairie Association.

Series Type	1	2	3	4
I.			.86	
II.	1.37	1.43	.98	
III.	1.58	1.55		
IV.		1.74	1.22	1.46
V.		1.59		
VI.	1.69	1.78		
VII.	1.87	1.95	1.99	1.79
VIII.	2.07	2.08	2.06	2.00*

* The average elevation was arbitrarily given a value of 2.00 because this was in a different part of the swamp and water level was different. Elevations of the other two associations are in relation to this.

Discussion.

Assuming that the fluctuations in water levels would be the same each year, it can be expected that the peat will, in time, accumulate to about the usual elevation of the water. Much higher accumulation would be reduced by oxidation.

The deeper water will have aquatic vegetation such as bladderwort (*Utricularia* spp.), water lily, and neverwet. As the plants die and decompose, the elevation of the peat increases and marsh plants, like beakrush, hardhead, and spike rush, enter the picture. As the accumulation increases, further maidencane, paint-root, fern and sphagnum take over. Then the woody plants, first water willow and button bush, then titi, sweet spire (*Itea virginica*), bamboo vine (*Smilax laurifolia*) and *S. Walteri*, fetter bush (*Laucothoe racemosa*), hurrah bush (*Lyonia lucida*), poor man's soap (*Clethra alnifolia*), and Cassena (*Ilex cassine*) become established. At about this stage, cypress (*Taxodium distichum nitans*) and the bays (*Persea borbonia*, *Magnolia virginiana* and *Gordonia lasianthus*) enter and these will ultimately predominate.

But the succession is not steadily progressive. There are setbacks. In time of extended drouths, the prairies dry out, the peat becomes more compact and is reduced by oxidation so that the general ground level is lowered. When the water returns, the succession is back to an earlier stage and part of it is repeated. If severe fires occur during the drouth, the more advanced associations are the most likely to be reduced. At such a time, houses and bays may be burned away and the ground level reduced to a point even lower than the general level of the open prairies.

III. WATER MOVEMENT STUDIES.

Nothing more than further substantiations of the findings reported previously was found during this period.

IV. WILDLIFE POPULATION STUDIES.

Two routes have been established and are covered at approximately two weeks intervals. One of these routes extended from the Camp Cornelia boat dock out the Canal to the point where the Chesser Prairie boat run begins, thence across Chesser Prairie to Cooter Lake, and thence to the Gap O'Grand Prairie. From thence the route goes to Gannett Lake if water levels and weather permit. If not, the route is varied to include Monkey Lake and Buzzard Roost Lake.

The other route extends across Billy's Lake to Billy's Island Landing, thence up Minnie's Lake run and Big Water run to the Big Water patrol cabin.

The mileage on these trips is recorded and waterfowl and other water birds, hawks, pileated woodpeckers, alligators and otters are recorded.

Cranes

As pointed out in the last report, last winter's crane population in the Okefenokes was the greatest within the memory of those who have lived in the swamp vicinity.

On January 29, 1957, 522 cranes were counted in one day spent in Chesser Prairie. With the coming of spring there was an abrupt drop in the numbers of cranes. The following are the numbers seen on the Chesser Prairie trips during the spring, summer, fall and early winter:

April 15	-	8
May 13	-	2
June 30	-	4
July 18	-	2
August 5	-	0
August 19	-	6
September 9	-	2
September 27	-	4
October 10	-	4
October 29	-	19
November 12	-	43
November 21	-	42
November 27	-	37
December 4	-	80
December 13	-	14

The Christmas bird count was held on January 1. Three parties operating in Chesser, Buck Lake and Chase Prairie reported 110 cranes.

The abrupt drop in cranes observed from the large concentrations in the winter to the only occasional observations through the summer and the increase in the observations in the fall and winter would lead to the belief that the native crane population is supplemented in the winter with migrants. Probably the migrants are of the northern sub-species, Grus canadensis tabida. This belief is further substantiated by Mr. Ambrosen's observations of cranes migrating northward over Piedmont Refuge in mid-March and migrating southward again in October.

While there was a decided increase in the number of cranes this winter over those of last summer, the population this winter is definitely lower than last winter. While it was the usual thing to see from 200 to 500 cranes during a day spent in Chesser Prairie last winter one would not expect to find more than a hundred there now as is indicated by the above listings. It is suggested that nearby crane habitat such as the Kissimmee Prairie in Florida was unfavorable for cranes last winter and the Okefenokee population was supplemented by cranes which would have normally not been here. This year, there is plenty of water in both areas and the cranes are more dispersed.

Snipes.

The snipe population is decidedly lower this winter than last winter. On the snipe count last January 29, 545 were reported. This year, only an occasional bird is flushed.

The reason is obvious. Last winter, the water level in the swamp averaged from a foot to two feet lower. The large areas of prairies which last year were in a soupy wet condition are now flooded.

Waterfowl.

Conditions are more favorable for ducks this year than they were last year. It is not possible to census the duck population of the swamp with any degree of accuracy since only a small sample of habitat can be covered. The best we can hope to do is to compare our observations with those of previous years. The following table shows the counts from October through December of the mallards, black ducks and wood ducks observed on the Floyd's Island-Prairie-Big Water and the Canal-Chesser and Grand Prairie routes. Pintails, gadwalls, baldpates, scaups, ring-necks and hooded mergansers were seen only occasionally. All waterfowl observations are being tabulated for future use.

ACTUAL COUNT OF DUCKS

Swansee Canal, Chesser and Grand Prairies

Floyd's Prairie-Big Water

	10/29	11/12	11/21	11/27	12/4	12/13	12/23	10/16	10/30	11/6	11/26	12/3	12/16
Mallard	0	41	87	70	98	341	35	0	0	0	0	0	4
Black	0	2	5	0	22	2	7	0	0	0	0	0	14
Wood Ducks	2	20	61	84	24	15	4	8	9	11	15	8	81

Hérons and Ibises.

The populations of Common egrets and Great blue herons has showed little change since summer. These species have been seen most commonly in Chesser and Grand Prairies. The following tabulation shows counts as made in this area during the period:

	7/18	8/5	8/19	9/9	9/27	10/10	10/29	11/12	11/27	12/9	12/13
Common Egret	26	4	14	6	2	24	24	35	80	49	18
Great Blue Heron	7	2	0	1	2	7	5	5	3	13	8

Little blue herons are most commonly seen along the Big Water run. They were quite common in the spring through the summer and fall and have been seen occasionally during the winter. The following tabulation shows the counts as recorded between Billy's Lake and Big Water.

	9/29	8/1	8/7	9/12	10/5	10/30	11/6	11/26	12/16
Little Blue Heron	5	3	2	12	0	16	5	0	5

White ibises and wood ibises were common in the spring. But neither species was seen after June 7 except for a flock of 30 white ibises seen November 26 and a lone wood ibis seen January 1, 1958. This is in sharp contrast from last year when both species were very common all through the late summer and fall. Probably the difference is due to the difference in water levels in the two years.

Big Game.

There has been no systematic big game inventory on the refuge. Observations of the animals and their signs have been recorded.

Bear signs have been reported from near the south boundary, Camp Cornelia, Cowhouse Island, Manor, Cane Creek, Surveyor's Creek and Minnie's Lake.

Deer signs have been seen on nearly all sides of the swamp. In October, Mr. Fuls and Mr. Chesser went to Blackjack Island. They were the first people to visit the island since before the 1954 fire. They reported deer signs abundant and they saw five which showed little fear of them.

V. WEED CONTROL.

The treatments of water hyacinth infestations at Ribbon's Pond, Argyle, Manor and Homerville were repeated. Those at Ribbon's Pond, Manor and Homerville appeared to have been eliminated but they will be inspected next summer to see if the hyacinths reappear. The infestation at Argyle will require further treatment.

A new infestation of water hyacinths of about two acres was found on the edge of Homerville last spring. Treatment resulted in about a 99% kill. A spot treatment was made later but further treatment will be required.

BREAKDOWN ON COST OF WATER HYACINTH TREATMENT

Species	Growth Stage	Date of Treatment	Acres	Herbicide	Diluent	Per Acre	Method of Appl.	Materials	Labor	Equip.
Eichonia crassipes	Flower	5/20/57	2	2,4-D 2,4,5-T	Water	2	Hose	2.00	2.72	.10

VI. COVER TYPE STUDIES.

Information collected in the field work discussed under item I, Ecological Succession Studies Following Construction of the Sill, and item II, Ecological Succession Following the 1954-1955 Fires, above, can be used in type descriptions.

VII. COMPILATION OF SPECIES LISTS.

Arrangement has been made with Dr. Wilbur Duncan, Department of Botany, University of Georgia, to identify, catalog and preserve plant specimens collected on the refuge. In this way, the specimens will escape the usual bug-eaten fate that befalls refuge plant collections and they will be available upon request.

VIII. PUBLIC RELATIONS.

A paper entitled "A Large Winter Population of Sandhill Cranes on Okefenokee National Wildlife Refuge" was submitted to the Georgia Oriole and was published in the June issue, Vol. 22, No. 2, of that organ.

Two notes were also submitted to the Oriole. One entitled "An Observation of the Limpkin near Albany" was published in the September, 1957 issue and the other entitled "Snow Goose in Okefenokee Swamp" appeared in the December 1957 issue.

The following notes were prepared for the Waycross Journal-Herald, the Charlton County Herald, and the Clinch County News:

Bear-Gator Battle in Swamp Park Draws Much Speculation - 8/12/57
 The Value of Our Non-Game Birds - 8/29/57
 Bird of the Month -
 Fall Migration of Butterflies Now Under Way - 10/12/57
 Migratory Monarch is known as Milkweed Butterfly - 10/16/57
 What Has Become of the Quails - 11/13/57
 Fox Not an Important Quail Enemy - 11/20/57
 Local Bird Club Plans Christmas Count on January 1 - 12/28/57

On October 10, Bill Bryant, staff writer for the Jacksonville Journal, was conducted on a trip into the swamp on the west side. His article was published as a feature entitled 'Mysteries Unveiled in Okefenokee Park in the October 20 issue of that paper.

Other special visitors who were accompanied on trips into the swamp were:

Captains Dalton and Favorite, U. S. Army Medical Corps, for collection of mosquitoes for research in encephalitis.

Mr. Michael Nadel, Assistant Secretary of the Wilderness Society, and Mrs. Nadel.

Dr. Beaudry, Montreal University. Collection of Solidago specimens for research in taxonomy and cytology of that genus.

Dr. Russell Siverly, Entomologist, U. S. Public Health Service, to collect mosquitoes for the study of encephalitis.

A Christmas bird count was organized and conducted on the refuge January 1. Five refuge personnel and twelve others participated. Ninety-one species and about 5,508 individuals were reported. The details of this count were reported in the September-December Narrative report. The count was reported to the editor of the Audubon Field Notes.

Respectfully submitted,

Eugene Cypert
Wildlife Management
Biologist

Date:

February 4, 1958.